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EXAMINER	
HOLLIDAY, JAIME MICHELE	
ART UNIT	PAPER NUMBER
2617	

DATE MAILED: 08/30/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/532,346	COSTA ET AL.	
	Examiner	Art Unit	
	Jaime M. Holliday	2617	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 July 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *15-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *15-28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Response to Amendment

Response to Arguments

1. Applicant's arguments with respect to **claims 15-28** have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was

not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. **Claims 15-16, 20-22 and 26-28** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Li et al. (Pub # U.S. 2002/0147017)** in view of **Ma et al. (Pub # 2004/001429 A1)**.

Consider **claim 15**, Liu et al. clearly show and disclose a method for allocating sub-carriers in a multi-cell, multi-subscriber wireless systems using orthogonal frequency division multiplexing (OFDM), reading on the claimed "method for managing radio resources in a cellular radio communications system configured as a multi-carrier system," (paragraphs 2 and 24), comprising:

allocating sub-carriers for data traffic channels in a cellular system that often include down link and up link control channels, uplink access channels, and time and frequency synchronization channels, and allocating clusters, a logical unit that contains at least one physical sub-carrier, to subscribers, reading on the claimed "allocating the radio resources for at least one frequency band having sub-carriers, to make the sub-carriers of the at least one frequency band being temporarily available to each radio cell for transmission of information," (fig. 8 and paragraphs 39-42); and

each cell has hexagonal structure with six sectors using directional antennas at the base stations with each shaded sector using half of the available OFDMA clusters and each unshaded sector using the other half of the clusters,

reading on the claimed "allocating the radio resources to the radio cells by temporarily assigning the sub-carriers of the at least one frequency band to at least two radio cells with each of the sub-carriers available to a subset of the at least two radio cells for transmission of the information," (fig. 8 and paragraph 103).

However, Li et al. fail to specifically disclose that the sub-carriers are allocated during different time periods.

In the same field of endeavor, Ma et al. clearly show and disclose a method of communicating over a shared OFDM band comprising: generating and transmitting a low rate mode OFDM transmission in a first frequency band of the OFDM band; generating and transmitting a burst-mode transmission in a second frequency band of the OFDM band, the first frequency band being distinct from the second frequency band (paragraph 86). FIG. 2 shows an example of time-frequency resource allocation for two different OFDM modes referred to as Mode-1 and Mode-2, which changes over time. For symbol periods t_i through t_{i+9}, a first allocation is shown with the first frequency band 51 assigned to Mode-1 traffic and the second frequency band 53 assigned to Mode-2 traffic. During symbol duration t_{i+10}, t_{i+11}, the entire OFDM band 50 is dedicated to Mode-2 traffic. During symbol duration t_{i+10} and onward, the first frequency band 51 is assigned to Mode-2 traffic while the second frequency band 53 is assigned to Mode-1 traffic, reading on the claimed "allocating radio resources for at least on frequency band having sub-carriers, to make the sub-carriers of the at least one

frequency band temporarily available during a first time period, and allocating the radio resources to the radio cells during a second time period," (paragraphs 124, 125).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to assign different sub-carriers to modes that are implemented at different periods as taught by Ma et al. in the method of Li et al., in order to efficiently allocate clusters in an OFDM system.

Consider **claim 16**, Li et al., as modified by Ma et al., clearly show and disclose the claimed invention **as applied to claim 15 above**, and in addition, Li et al. further disclose that a base station may allocate basic and auxiliary clusters to one subscriber before allocating any clusters to other subscribers, reading on the claimed "assigning makes at least one of the sub-carriers available to exactly one radio cell in the at least two radio cells," (paragraph 50).

Consider **claim 20**, Li et al., as modified by Ma et al., clearly show and disclose the claimed invention **as applied to claim 15 above**, and in addition, Li et al. further disclose that a cluster can contain consecutive or disjoint sub-carriers, reading on the claimed "assigning makes at least some adjacent sub-carriers in the frequency band available to at least one radio cell," (paragraph 40).

Consider **claim 21**, Li et al., as modified by Ma et al., clearly show and disclose the claimed invention **as applied to claim 15 above**, and in addition, Li et al. further disclose a procedure of selective sub-carrier allocation including

algorithms used by a base station for sub-carrier selections. These algorithms are conceived to be a self-consistent sequence of steps leading to a desired result. The steps are those requiring physical manipulations of physical quantities that take the form of electrical or magnetic signals that are referred to as bits, values, elements, symbols, characters, terms, numbers, or the like, reading on the claimed "assigning of the sub-carrier takes place in accordance with an algorithm that includes use of a code," (paragraphs 31 and 33).

Consider **claim 22**, Li et al., as modified by Ma et al., clearly show and disclose the claimed invention **as applied to claim 21 above**, and in addition, Li et al. further disclose base station assigns desirable clusters to the subscriber making the request. A cluster allocation and load scheduling controller **1301**, in the base station, collects all the necessary information for making the decision on cluster allocation, and informs the subscribers about the decisions through control signal channels, reading on the claimed "assigning makes the sub-carriers used by base stations of particular radio cells available for transmission of broadcast information," (paragraphs 88-89).

Consider **claim 26**, Li et al., as modified by Ma et al., clearly show and disclose the claimed invention **as applied to claim 15 above**, and in addition, Li et al. further disclose allocating sub-carriers in an orthogonal frequency division multiple access (OFDMA) system, reading on the claimed "cellular radio communications system is an orthogonal frequency division multiplexing system," (paragraph 2).

Consider **claim 27**, Liu et al. clearly show and disclose allocating sub-carriers in a multi-cell, multi-subscriber wireless systems using orthogonal frequency division multiplexing (OFDM), reading on the claimed "radio communication system of cellular construction configured as a multi-carrier system using at least one frequency band having sub-carriers for transmission of information," (paragraphs 2 and 8), comprising:

Cell A, Cell B and Cell C, reading on the claimed "at least two radio cells" (fig. 8 and paragraph 104); and

an apparatus allocating sub-carriers for data traffic channels in a cellular system that include frequency synchronization channels, and allocating clusters, a logical unit that contains at least one physical sub-carrier, to subscribers, reading on the claimed "at least one control device assigning the sub-carriers of the at least one frequency band to said at least two radio cells so that the sub-carriers are temporarily available to each radio cell for transmission of information," (fig. 8 and paragraphs 8 and 39-42); and

each shaded sector of a cell using half of the available OFDMA clusters and each unshaded sector of a cell using the other half of the clusters, reading on the claimed "temporarily each of the sub-carriers is available to a subset of the at least two radio cells for transmission of information," (fig. 8 and paragraph 103).

However, Li et al. fail to specifically disclose that the sub-carriers are allocated during different time periods.

In the same field of endeavor, Ma et al. clearly show and disclose a method of communicating over a shared OFDM band comprising: generating and transmitting a low rate mode OFDM transmission in a first frequency band of the OFDM band; generating and transmitting a burst-mode transmission in a second frequency band of the OFDM band, the first frequency band being distinct from the second frequency band (paragraph 86). FIG. 2 shows an example of time-frequency resource allocation for two different OFDM modes referred to as Mode-1 and Mode-2, which changes over time. For symbol periods t_i through t_{i+9}, a first allocation is shown with the first frequency band 51 assigned to Mode-1 traffic and the second frequency band 53 assigned to Mode-2 traffic. During symbol duration t_{i+10}, t_{i+11}, the entire OFDM band 50 is dedicated to Mode-2 traffic. During symbol duration t_{i+10} and onward, the first frequency band 51 is assigned to Mode-2 traffic while the second frequency band 53 is assigned to Mode-1 traffic, reading on the claimed "assigning the sub-carriers of the at least one frequency band to said at least two radio cells during a first time period, and that during a second time period temporarily each of the sub-carriers is available," (paragraphs 124, 125).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to assign different sub-carriers to modes that are implemented at different periods as taught by Ma et al. in the method of Li et al., in order to efficiently allocate clusters in an OFDM system.

Consider **claim 28**, Liu et al. clearly show and disclose an apparatus for allocating sub-carriers in a multi-cell, multi-subscriber wireless systems using orthogonal frequency division multiplexing (OFDM) with data traffic channels, that include sub-carriers, in a cellular system that often include down link and up link control channels, uplink access channels, and time and frequency synchronization channels, reading on the claimed "control device of a radio communication system of cellular construction, that is configured as a multi-carrier system having at least two radio cells with at least one frequency band having sub-carriers for transmission of information in the at least two radio cells," (fig. 8 and paragraphs 39-42), comprising:

a cluster allocation and load scheduling controller allocating sub-carriers for data traffic channels in a cellular system that often include down link and up link control channels, uplink access channels, and time and frequency synchronization channels, and allocating clusters, a logical unit that contains at least one physical sub-carrier, to subscribers, reading on the claimed "means for temporarily assigning the sub-carriers of the at least one frequency band to the at least two radio cells so that the sub-carriers are available to each radio cell for the transmission of the information," (fig. 8 and paragraphs 39-42 and 90); and

each cell having hexagonal structure with six sectors using directional antennas at the base stations with each shaded sector using half of the available OFDMA clusters and each unshaded sector using the other half of the clusters, reading on the claimed "means for temporarily assigning the sub-carriers of the

at least one frequency band among the at least two radio cells so that each of the sub-carriers is available to a subset of the at least two radio cells for the transmission of the information," (fig. 8 and paragraph 103).

However, Li et al. fail to specifically disclose that the sub-carriers are allocated during different time periods.

In the same field of endeavor, Ma et al. clearly show and disclose a method of communicating over a shared OFDM band comprising: generating and transmitting a low rate mode OFDM transmission in a first frequency band of the OFDM band; generating and transmitting a burst-mode transmission in a second frequency band of the OFDM band, the first frequency band being distinct from the second frequency band (paragraph 86). FIG. 2 shows an example of time-frequency resource allocation for two different OFDM modes referred to as Mode-1 and Mode-2, which changes over time. For symbol periods t_i through t_{i+9}, a first allocation is shown with the first frequency band 51 assigned to Mode-1 traffic and the second frequency band 53 assigned to Mode-2 traffic. During symbol duration t_{i+10}, t_{i+11}, the entire OFDM band 50 is dedicated to Mode-2 traffic. During symbol duration t_{i+10} and onward, the first frequency band 51 is assigned to Mode-2 traffic while the second frequency band 53 is assigned to Mode-1 traffic, reading on the claimed "assigning the sub-carriers of the at least one frequency band during a first time period so that the sub-carriers are temporarily available, and assigning the sub-carriers of the at least one

frequency band during a second time period so that each of the sub-carriers is temporarily available," (paragraphs 124, 125).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to assign different sub-carriers to modes that are implemented at different periods as taught by Ma et al. in the method of Li et al., in order to efficiently allocate clusters in an OFDM system.

6. **Claims 17-19** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Li et al. (Pub # U.S. 2002/0147017)** in view of **Ma et al. (Pub # 2004/001429 A1)**, and in further view of **Wang et al. (U.S. Patent # 6,917,580 B2)**.

Consider **claim 17**, and **as applied to claim 16 above**, Li et al., as modified by Ma et al., clearly show and disclose the claimed invention except that the all the sub-carriers are assigned to exactly one cell.

In the same field of endeavor, Wang et al. clearly show and disclose a cellular communication system for wireless telecommunication on the basis of an OFDM scheme. Three cells (C_1 C_2 C_3) are divided into three sectors. The entire frequency band of the wireless cellular OFDM system is also divided into three subbands. Within one cell (C_1 C_2 C_3) subband is allocated to each sector, reading on the claimed "assigning makes each of the sub-carriers available to exactly one radio cell in the at least two radio cells," (abstract, col. 1 lines 53-55).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to designate subbands to the sectors in

one cell as taught by Wang et al. in the method of Li et al., as modified by Ma et al., in order to efficiently allocate clusters in an OFDM system.

Consider **claim 18**, and **as applied to claim 15 above**, Li et al., as modified by Ma et al., clearly show and disclose the claimed invention except that the cells are adjacent.

In the same field of endeavor, Wang et al. clearly show and disclose within a cellular communication system for wireless telecommunication, using an OFDM scheme, three adjacent cells (C_1 C_2 C_3), reading on the claimed "at least two radio cells are adjacent radio cells," (abstract and col. 4 line 49).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to have adjacent cells as taught by Wang et al. in the method of Li et al., as modified by Ma et al., in order to represent an OFDM system.

Consider **claim 19**, and **as applied to claim 15 above**, Li et al., as modified by Ma et al., clearly show and disclose the claimed invention except that the sub-carriers are spaced according to the number of cells.

In the same field of endeavor, Wang et al. clearly show and disclose a cellular communication system for wireless telecommunication on the basis of an OFDM scheme. A typical wireless cellular OFDM communication system is shown, which comprises a plurality of cells (Z_1 Z_2 Z_3) and a plurality of base stations, whereby each base station is allocated to one of the cells. Each base station within each cell communicates with the respective active mobile terminals

within the cell area. In the wireless cellular OFDM system the frequency reuse factor is three, FRF=3, where the frequency reuse factor is relevant to the frequency reuse distance, reading on the claimed "assigning of the sub-carriers is to n radio cells, making assigned sub-carriers available to at least one radio cell have a frequency spacing of n sub-carriers," (fig. 3, abstract, col. 1 lines 28-37).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made for the frequency reuse factor to be the same as the number of cells as taught by Wang et al. in the method of Li et al., as modified by Ma et al., in order to efficiently allocate clusters in an OFDM system.

7. **Claim 23** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Li et al. (Pub # U.S. 2002/0147017)** in view of **Ma et al. (Pub # 2004/001429 A1)**, and in further view of **Frodigh et al. (U.S. Patent # 5,726,978)**.

Consider **claim 23**, and **as applied to claim 22 above**, Li et al., as modified by Ma et al., clearly show and disclose the claimed invention except that the information sent over the channel is used for handovers.

In the same field of endeavor, Frodigh et al. clearly show and disclose a method of adaptive channel allocation in an OFDM system. The system provides an allocation of sub-carriers to each link of the OFDM system, reading on the claimed "method for managing radio resources in a cellular radio

communications system configured as a multi-carrier system," (col. 4 lines 26-30). The system includes a dedicated control channel (DCCH) that is both an uplink and a downlink channel for transmitting control information for handovers, reading on the claimed "broadcast information is used to decide on handovers," (col. 7 lines 30-32).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to use control information for handovers as taught by Frodigh et al. in the method of Li et al., as modified by Ma et al., in order to efficiently perform handovers in an OFDM system.

8. **Claims 24-25** are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of **Li et al. (Pub # U.S. 2002/0147017)** and **Ma et al. (Pub # 2004/001429 A1)**, in view of **Frodigh et al. (U.S. Patent # 5,726,978)**, and in further view of **Obayashi (Pub # U.S. 2002/0082016 A1)**.

Consider **claim 24**, and **as applied to claim 23 above**, the combination of Li et al. and Ma et al., as modified by Frodigh et al., clearly show and disclose the claimed invention except that the amplitudes of the control information are determined.

In the same field of endeavor, Obayashi clearly show and disclose a mobile communication terminal apparatus which performs radio communication with base stations and selects the base station optimal for a handover in advance based on the electric field intensity values of several previous times as well as

the weakest value, from the monitor result of the pilot channel, reading on the claimed "determining amplitudes of the broadcast information in subscriber stations receiving the broadcast information," (abstract and paragraph 92).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to the intensity of the pilot as taught by Obayashi in the method of Li et al. and Ma et al., as modified by Frodigh et al., in order to efficiently perform handovers in an OFDM system.

Consider **claim 25**, and **as applied to claim 24 above**, the combination of Li et al. and Ma et al., as modified by Frodigh et al., clearly show and disclose the claimed invention except that the amplitudes of the control information are determined.

In the same field of endeavor, Obayashi clearly show and disclose that a base station for handover is selected based on the average height of the electric field intensity values from the monitor result of the pilot channel, reading on the claimed "determining a metric of the amplitudes of the broadcast information transmitted from one of the base stations on the sub-carriers available to the one of the base stations," (abstract and paragraph 92).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to the intensity of the pilot as taught by Obayashi in the method of Li et al. and Ma et al., as modified by Frodigh et al., in order to efficiently perform handovers in an OFDM system.

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jaime M. Holliday whose telephone number is (571) 272-8618. The examiner can normally be reached on Monday through Friday 7:30am to 4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph Feild can be reached on (571) 272-4090. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

CHARLES APPIAH
PRIMARY EXAMINER

Jaime Holliday
Patent Examiner